2. The Hill connector (4) under tension, raises the ballast-weighted piston (8), bringing fluid in under the force of gravity on the upstroke and still under tension caused by the ballast-weighted piston (8), pumps the fluid out by the weight of the ballast-weighted piston (8) on the down stroke.

3. The connector (4) can be either flexible or rigid in all or in part as it is always in a state of tension and the top of the pumping cylinder is open, requiring no sealing, packing to restrict the length of a connector (4) or rigid shaft.

4. The Hill connector (4) allows a pump stroke that is limited only by the length of the cylinder (7) thereby being able to create a pumping chamber of any length required, without concern for to the connector (4) it's attachments, packing or rigid shafts. This allows the Hill pump to accommodate great wave, tide and current changes.

RESPONSE TO CLAIM REJECTIONS UNDER 35 USC $ 102

1. Applicant herewith cites differences and improvements not anticipated by Villanueva et al (USPN 4,249,084):

2. Applicant alleges the crux of his invention is the ballasted weighted piston (8) as shown in applicant's "Request For Reconsideration", March 26, 2007, page 7, line 15 through page 8 line 3 and shown in drawing Figures 1-3. No other invention use ballast in the piston (8).

The advantages to this arrangement on pointed out in applicant's "Request For Reconsideration", March 26, 2007, page 2 lines1-19 and page 3 lines1-11.

3. Petitioner alleges the examiner has erred in stating that Villanueva et al (USPN 4,249,084) "reads through or over" petitioner claim by having the ballast in the buoy. Petitioner points out that in order for Villanueva's piston to pump on the down stroke with the ballast in the buoy, it must have a rigid, non-flexible connector between the piston and the buoy as this connector is in a state of compression on the down stroke. As petitioner's piston (8) is weighted or the ballast is in the piston only, it is an improvement over Villanueva in that the Hill connector (4) is always in a state of tension vs. compression. The Hill connector (4) therefore can be flexible such as an anchor chain shown in Fig. 1-3. The buoy (1) is used to lift the weight of the ballasted weighted piston (8) buoy (1), connector (4) are separate entities, connected together, reacting differently and separately to separate forces. The Hill buoy (1) is designed for lifting of the ballasted weighted piston (8) only, the ballasted weighted piston (8) is designed to create pressure on the down stroke to pump fluid, the connector (4) joins these two components together. may be flexible to accommodate shifting currents, wave, tide conditions and works in waters of great depths such as 2500 ft. off of the Pacific California Coast. The only way the examiner could interpret Villanueva as "reading through" is by considering Villanueva's buoy, connector and piston as a single rigid entity, all reacting in the same exact manner to a single force. To make a single rigid entity as in Villanueva that would accommodate conditions such as the 2500 ft. depths off of the Pacific California Coast would be impractical if not impossible due to the several different forces applied to this single entity.

4. Villanueva's buoy is designed to both lift its' piston and is provided with ballast in the buoy to drive piston down. This requires a rigid connector shaft between the buoy and piston as the shaft is in compression on the down stroke and physical limits exist as to how long this shaft can be without support.
5. Inventor further alleges that the examiner has erred on page 9 of his final rejection citing that "Villanueva connector can be flexible as shown in Villanueva's Figure 15. Petitioner notes this figure does not show Villanueva claiming to use a flexible connector but that Villanueva cites buoys with flexible connectors as prior art and Villanueva makes no written claim to using a flexible connector.
6. The ballast in the Hill pump is in the weighted-ballasted piston (8) thus eliminating the need for a rigid shaft-connector as required in Villanueva's with the ballast in the buoy.
7. The Hill connector (4) is always in a state tension and never in compression thus the Hill connector (4) can be either flexible or rigid whereas the Villanueva's connector is in compression on the down stroke which requires a rigid connector to withstand said compression.
8. Villanueva's design mandates a cylinder that pivots on an anchored base with the wave and tide action.
9. The Hill cylinder (7) requires no pivot point.
10. Villanueva's design mandates a cylinder that requires a packing seal between the rigid shaft and the top end of the cylinder-pumping chamber.
11. The Hill cylinder (7) is open at the top end and requires no packing or rigid shaft.
12. Villanueva ballast weighted buoy draws in and expel fluid on both the upstroke, using the buoyancy of the buoy and using the ballast in the buoy on down stroke.

13. The purpose of the Hill buoy is to lift the Hill's weighted-ballasted piston (8), taking in fluid on the upstroke only and allowing the weighted-ballasted piston to descend, while still keeping the connector (4) is still in a state of tension, and pump fluid only on the down stroke.

Applicant alleges the examiner erred in alleging Villanueva and Anderson anticipated applicant's claims and herewith cites differences and improvements not anticipated by Anderson and by Anderson over Villanueva:

1. The Anderson flexible connector is used to lift the piston without ballast and pump fluid on the upstroke while allowing fluid to flow into the pumping chamber as the piston descends under the force of gravity on the down stroke.

2. The upper end of the Anderson pump must be enclosed when the flexible connector is used this way.

3. This mandates the use of rigid shaft to pass through packing seals or "O" rings at the top of the pumping chamber and attached to the flexible connector outside of the pumping chamber at the shaft's upper end while the shaft's lower end is connected to the piston.

4. Either packing or sealing "O" rings must be used where the shaft exits the pumping chamber and connects to the flexible connector.

5. Using the flexible connector to pump on the upstroke mandates the pumping chamber be defined as the upper top surface of the piston, enclosed top cylinder,

cylinder walls between the top of the piston and the top of the cylinder, cylinder shaft, packing and/or "O" rings surrounding the shaft and the hole at the top of the pumping cylinder where the shaft exits.

6. The Anderson flexible connector with it's rigid shaft connection restricts the length of the pumping motion to the length of said shaft.

Whereas my connector is an improvement as it –

1. The Hill connector (4) raises Hill's weighted-ballasted piston (8), bringing fluid in under the force of gravity on the upstroke and pumping the fluid out by the weight of Hill's weighted-ballasted piston (8) on the down stroke.
2. This eliminates the need for a rigid shaft enclosed in packing between the connector and piston as is needed in the Anderson pump.
3. This eliminates the need for an enclosed upper end as the pumping chamber as is needed in the Villanueva and Anderson pumps.
4. This eliminates the need for packing or sealing "O" rings around a rigid shaft as is needed in the Villanueva and Anderson pumps.
5. The Hill connector (4) allows the pumping chamber to be defined by the bottom of the surface of Hill's weighted-ballasted piston (8), Hill cylinder walls (7) and enclosed bottom of cylinder (13).